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# MEDICAL AND DENTAL RESEARCH AT UNDERGRADUATE LEVEL: EVALUATION OF OPPORTUNITIES AND BARRIERS

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## ABSTRACT

***Objective:*** To evaluate available opportunities and highlight the barriers faced by undergraduate medical and dental students of Rawalpindi and Islamabad while conducting a research study.

***Study Design:*** Cross sectional descriptive study.

***Place and Duration of Study:*** This study was conducted in 6 recognized medical and dental colleges of Rawalpindi and Islamabad in 5 months from July to November 2009.

***Methodology:*** A pre-tested, structured questionnaire was used as data collection instrument. The questionnaire was self-administered to 300 medical and dental students. Opportunities and barriers to undergraduate research were recorded as mean values and percentages.

***Results:*** A total of 86.2% of the students acknowledged that there is a need of research at undergraduate level. Forty two point nine percent claimed that they know how to plan, conduct a study and write a research article. Thirty six point four percent of the participants reported the presence of research promoting activities in their institutes, whereas a large number of students reported barriers such as lack of encouragement by faculty (58.1% of participants) and absence of a supporting attitude of the college administration (72.9% of participants). The advertisement of research opportunities was mainly through faculty members/friends/colleagues and the percentage value for availability of adequate funds for research was 16.1%.

***Conclusions:*** Majority of undergraduate medical students in the Rawalpindi / Islamabad region acknowledged that they do not have satisfactory knowledge about planning, conducting and writing a research study and they have to face more obstacles in comparison to limited opportunities while conducting a research study. The situation for dental students is even worse.

**Keywords:** Undergraduate, Research, Opportunities, Barriers

## INTRODUCTION

The basic purpose of medical and dental research is to advance scientific knowledge and hence lead to improvements in the prevention and treatment of disease[1]. Medical and dental research at undergraduate level enables students to appreciate the discovery process resulting in best possible care provided to patients in the most effective manner[2,3]. Involvement in research as a medical student is strongly associated with postgraduate research initiatives[4-6]. Moreover research at this level helps in development of critical thinking, reasoning skills and a positive mind-set towards research from the start of their medical career[4,7].

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Although there is a general agreement on the importance of promoting research understanding and skills at the undergraduate level, little evidence is found supporting practical initiatives in this context[8]. A study carried out at Princeton University, USA demonstrated that the percentage of graduating medical students with strong research intentions decreased from 14.7% to 11.7%[9].

Research at undergraduate level is not without setbacks such as deficiency of quality mentorship eventually leads to disconnection with research[7]. Other problems like neglection of routine studies and deterioration of clinical skills have also been reported[10,11]. Moreover, research is yet to be included in undergraduate curriculum in most of the South Asian countries[5].

In Pakistan, medical and dental schools offer a 5 year programme of Bachelors of Medicine and Bachelors of Surgery (MBBS) and

a 4 year programme of Bachelors of Dental Surgery (BDS). During the first two years in both programmes, basic health sciences are the primary focus. Clinical training gradually increases as the years progress and is at its peak in the final year of the respective programmes[12]. The students of clinical years are expected to have more research experience due to their longer stay at the institute and more exposure to research as compared to those who are in the beginning of their medical or dental education. A recent study carried out at the Aga Khan University, Karachi demonstrated that the level of knowledge and attitude towards health research was moderate in a group of undergraduate medical students[13] but the overall number of students' research articles remains small in Pakistan[17].

Considering these facts, there is a great need to identify and assess the situation of undergraduate medical and dental research in the context of availability of opportunities and barriers faced by students in carrying out a research study.

## MATERIAL AND METHODS

This cross-sectional descriptive study was conducted on 3rd year and final year BDS students and 4th year and final year MBBS students of six PM&DC recognized medical and dental colleges of Rawalpindi and Islamabad.

Data was collected from 300 students. Equal numbers of students were selected from each category i.e. MBBS and BDS. The participants were selected under non-probability, convenience sampling technique. The ethics review board at the Armed Forces Institute of Dentistry approved the study.

The questionnaires were distributed personally by authors. At the end a visual examination of questionnaires was carried out to minimize the risk of unintentionally missed data. Information gathered through this survey was kept confidential and the privacy of the participants was respected.

Our data collection instrument was a structured, self-administered and pre-tested questionnaire. It was divided into five sections that comprised of questions pertaining to awareness and orientation of the students towards research, evaluation of research promoting activities, assessment of facilities available, estimation of barriers faced and availability of faculty and administration support at the respective institutes. The demographic details of participants included the name of institute, clinical year and programme (BDS or MBBS). All the questions were to be answered in either a "Yes" or a "No".

**Statistical analysis:**

The data collected from this survey was recorded and analyzed in Statistical Package for Social Sciences 15.0 (SPSS, Inc., Chicago, IL, USA). Descriptive analysis was performed for mean values and proportions. Chi-square test was done for the comparison of categorical variables; MBBS and BDS. Results were recorded as frequencies, mean ± standard deviations (SD) and *p*-values. For all purposes, a *p*-value of $<0.05$ was considered as the criteria of significance.

## RESULTS

Out of 300 students, 150 were from MBBS and 150 were from BDS. A total of 86.2% of the students acknowledged that there is a need of research at undergraduate level. While 42.9% claimed that they knew how to plan and conduct a research study and 41.9% claimed that they could write a research article.

The publicity of research opportunities was mainly through faculty members/ friends/ colleagues (Fig. 1).

The facility of undergraduate research laboratories was available to only 16.2% of all the participants. A detailed picture of situations of computer and internet facility and libraries is shown in fig. 2.

A total of 58.1% of the participants demonstrated lack of encouragement by the faculty. Seventy two point nine percent reported that administration was not supportive in carrying out research projects at their institutes. Sixteen point one percent of the

participants reported presence of adequate research funds in their institutes.

The detailed comparison of research promoting activities and barriers faced by MBBS and BDS students is shown in table 1 and table 2 respectively.

## DISCUSSION

Though most of the students realize that there is a need for research at undergraduate level but their knowledge about conceiving and following a research study requires improvement. Similar results were shown in a recent study conducted at Agha Khan University, Karachi[13]. It was found after thorough analysis and evaluation that lack of research promoting activities was a major reason contributing to this effect. Many students complained of limited opportunities for arranging meetings with researchers and scholars. Students' participation in workshops, symposiums and conferences was also found to be limited as most of their time was occupied in fulfilling clinical requirements, completing laboratory work or securing quality grades in their academics. Our results coincide with the finding of Henzi *et al*[14] who showed that meeting clinical and academic requirements is one of major factors that hampers undergraduate medical and dental students from participating in research.

The publicity of research opportunities through proper channel like newsletters, poster, pamphlets etc was inadequate. The role of faculty and administration towards promotion of research activities and encouraging the students to participate in such experiences was found to be dismal. Faculty's lack of understanding of students' schedules and their academic pressures causes frustration and unmet expectations; this is why many students avoid participating in research activities.

According to most of the students the funds available for undergraduate research were insufficient. Though the facilities of internet and library were available to most of the students but a minor fraction of students had the facility of undergraduate research laboratories. Moreover the working hours for

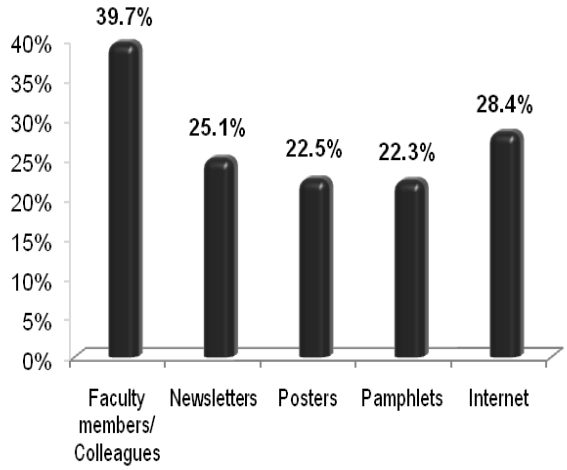


**Fig. 1: Graphic representation of percentages for different means of publicity of research opportunities.**

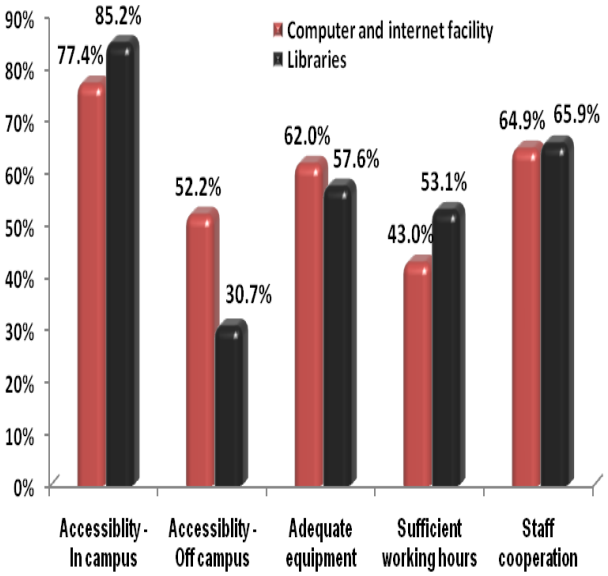


**Fig 2: Graphic representation of situation of libraries and computer and internet facility.**

internet and library facilities was reported to be insufficient by almost half of the students.

Sufficient research opportunities are often available in most institutes of the North America and Europe[16]. In Pakistan, where there are limited research opportunities, the interest and orientation towards research on part of students is also very disappointing. Immediate and effective improvements in research environment are required especially in dental institutes. Appropriate measures should be taken by concerned authorities to remove these barriers.

**Table 1: Comparison of the percentages for "Availability of research promoting activities" between medical and dental students**

| Research promoting activities | MBBS | BDS | *p*-value |
|---|---|---|---|
| Interactive lectures / tutorials * | 65.3% | 37.3% | <0.001 |
| Research roundtables and discussions with faculty * | 42.4% | 15.5% | <0.001 |
| Conferences / Seminars * | 64.8% | 39.5% | <0.001 |
| Meetings with academics / researchers / scholars * | 37.8% | 10.1% | <0.001 |
| Student research orientation day * | 24.1% | 4.7% | <0.001 |
| Workshops and symposiums | 50.2% | 42.7% | 0.190 |

** Significant value*

**Table 2: Comparison of the percentages for "Barriers faced" between medical and dental students**

| Barriers Faced | MBBS | BDS | *p* -value |
|---|---|---|---|
| Lack of supervision * | 76.1% | 89.9% | 0.001 |
| Lack of funding * | 81.2% | 92.6% | 0.006 |
| Insufficient knowledge about planning & conducting * | 77.9% | 88.6% | 0.009 |
| Lack of facilities (Research labs/Internet/Libraries etc) * | 73.4% | 84.7% | 0.029 |
| Insufficient knowledge about writing and publishing | 74.9% | 83.1% | 0.118 |
| Lack of orientation | 78.5% | 84.0% | 0.164 |
| Academic overload | 87.4% | 91.9% | 0.264 |
| Lack of time | 80.4% | 83.2% | 0.640 |
| Lack of interest | 64.7% | 64.0% | 0.771 |

** Significant value*

The findings of this study show the condition in the medical and dental institutes of Rawalpindi and Islamabad only. To understand the situation of medical and dental institutes in other parts of country we need further exploration on a larger scale. This study has not covered the aspects regarding the quality of research being done at student level.

## CONCLUSION

Most of undergraduate medical and dental students in the Rawalpindi and Islamabad acknowledge that there is need of research at undergraduate level but they admit that they have insufficient knowledge about planning, conducting and writing a research study.

They also have limited opportunities in carrying out research projects. The situation for dental students is even worse as only quarter of dental students reported availability of research promoting activities at their institute as compared to the half of the medical students.

## RECOMMENDATIONS

A course on Research Methodology should be made compulsory at undergraduate level.

The administration should organize symposiums, workshops, conferences and research orientation days in their respective institutions at least on twice a year basis.

Supervisors should be easily available to students and they should encourage their colleagues to facilitate undergraduate research projects.

The medical and dental journals should have a section for students' articles.

The research at undergraduate level should be encouraged, for example, by awarding scholarships and certificates etc. Students with best research articles should be given an opportunity to present their study in national and international symposiums.

An undergraduate research forum should be established in every institute. It can help in advertising research opportunities, finding faculty support, arranging funds and keeping a record of research projects[15].

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